Géométrie

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Bryan P. RYNNE, Martin A. YOUNGSON. — **Linear functional analysis.** — Springer undergraduate mathematics series. — Un vol. broché, 17×23,5, de x, 273 p. — ISBN 1-85233-257-3. — Prix : DM 59.00. — Springer, London, 2000.

Providing an introduction to the ideas and methods of linear functional analysis, this book shows how familiar and useful concepts from finite-dimensional linear algebra can be extended or generalized to infinite-dimensional spaces. In the initial chapters the theory of infinite-dimensional normed spaces (in particular Hilbert spaces) is developed, while in later chapters the emphasis shifts to studying operators between such spaces. Functional analysis has applications to a vast range of areas of mathematics; the final chapter discusses the two particularly important areas of integral and differential equations.

Calcul des variations

Richard VINTER. — **Optimal control.** — Systems & control : foundations & applications. — Un vol. relié, 16×24, de XV, 507 p. — ISBN 0-8176-4075-4. — Prix : SFr. 138.00. — Birkhäuser, Boston, 2000.

Optimal control emerged as a distinct field of research only in recent decades. It provides a unified perspective of optimization problems, arising in scheduling and the control of engineering devices, that are beyond the reach of traditional analytical and computational techniques. In addition, the field has contributed significant advances to branches of applied mathematics and broad applications in process control, scheduling, robotics, resource economics, and other areas. This book brings together many of the important advances in 'nonsmooth' optimal control over the last two decades concerning necessary conditions, minimizer regularity and global optimality conditions associated with the Hamilton-Jacobi equation. The book's development and analysis is largely self-contained and incorporates many simplifications and unifying features for subjects' key concepts and foundations. This new book is an essential resource for an authoritative and comprehensive presentation of the foundations and applications of nonsmooth optimal control.

Géométrie

Claude-Alain FAURE and Alfred FRÖLICHER. — **Modern projective geometry.** — Mathematics and its applications, vol. 521. — Un vol. relié, 16,5×24,5, de XVII, 363 p. — ISBN 0-7923-6525-9. — Prix : Dfl. 270.00. — Kluwer Academic Publishers, Dordrecht, 2000.

This monograph develops projective geometries and provides a systematic treatment of morphisms. It is unique in that it does not confine itself to isomorphisms. This work introduces a new fundamental theorem and its applications describing homogeneous co-ordinates as morphisms of projective geometries by semilinear maps. Other topics treated include three equivalent definitions of projective geometries and isomorphism theorems, recent results in dimension theory, morphisms and homomorphisms of projective geometries, special morphisms, duality theory, morphisms of affine geometries, polarities, orthogonalities, Hilbertian geometries and propositional systems. The book concludes with a large section of exercises.

Richard HARTLEY, Andrew ZISSERMAN. — **Multiple view geometry in computer vision.** — Un vol. relié, 18×25, de XVI, 607 p. — ISBN 0-521-62304-9. — Prix : £60.00. — Cambridge University Press, Cambridge, 2000.

A basic problem in computer vision is to reconstruct a real world scene given several images of it. This book describes techniques for solving this problem which have been developed from projective geometry and photogrammetry. Recent major developments in the theory and practice

of scene reconstruction and auto-calibration are described in detail in a unified framework. The book covers the geometric principles, their algebraic representation in terms of camera projection matrices, the fundamental matrix and the trifocal tensor. The theory and methods of computation of these entities is discussed with real examples, as is their use in the reconstruction of scenes from multiple images. Comprehensive background material is provided, so a reader familiar with linear algebra and basic numerical methods will be able to understand the projective geometry and estimation algorithms presented, and implement the algorithms directly from the book.

Robin HARTSHORNE. — **Geometry: Euclid and beyond.** — Undergraduate texts in mathematics. — Un vol. relié, 18×24, de XI, 526 p. — ISBN 0-387-98650-2. — Prix: DM 98.00. — Springer, New York, 2000.

The book offers an opportunity to understand the essence of one of the great thinkers of western civilization. A guided reading of Euclid's *Elements* leads to a critical discussion and rigorous modern treatment of Euclid's geometry and its more recent descendants, with complete proofs. Topics include the introduction of coordinates, the theory of area, geometrical constructions and finite field extensions, history of the parallel postulate, the various non-Euclidean geometries, and the regular and semiregular polyhedra. The text is intended for junior- to senior-level mathematics majors.

Patrice TAUVEL. — **Cours de géométrie**. — Agrégation de mathématiques. — CAPES/AGREG. — Un vol. broché, 17×24, de X, 491 p. — ISBN 2-10-004592-X. — Prix: FF 235.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage traite l'essentiel du programme de géométrie au concours de l'agrégation de mathématiques. Il reprend certains sujets enseignés dans les seconds cycles universitaires et ne suppose aucune connaissance préalable en géométrie. Il peut donc être utilisé avec profit par les étudiants de licence ou de maîtrise de mathématiques. Dans les 31 chapitres de ce livre sont traités: les réseaux, les angles, les espaces affines, la géométrie euclidienne, les coniques, les polyèdres, les espaces projectifs, les courbes et les surfaces. Afin d'être autonome, ce cours intègre également un chapitre traitant de calcul différentiel. Les résultats sont tous accompagnés de leur démonstration.

Géométrie différentielle

D. BAO, S.-S. CHERN, Z. SHEN. — **An introduction to Riemann-Finsler geometry.** — Graduate texts in mathematics, vol. 200. — Un vol. relié, 16×24, de XX, 431 p. — ISBN 0-387-98948-X. — Prix: DM 98.00. — Springer, New York, 2000.

In Riemannian geometry, measurements are made with both yardstick and protractors. These tools are represented by a family of inner products. In Riemannian-Finsler geometry (or Finsler geometry for short), one is in principle equipped with only a family of Minkowski norms. So yardsticks are assigned, but protractors are not. With such a limited tool kit, it is natural to wonder, just how much geometry one can uncover and describe? It now appears that there is a reasonable answer. Finsler geometry encompasses a solid repertoire of rigidity and comparison theorems, most of them founded upon a fruitful analogue of the sectional curvature. There is also a bewildering array of explicit examples, illustrating many phenomena which admit only Finslerian interpretation. This book focuses on the elementary but essential items among these results.